

SEB Information for Professionals

Agent: Staphylococcal enterotoxin B (SEB), one of seven staphylococcal enterotoxins, is the best studied potential bioterrorism weapon of a group of molecules described as superantigens; others include two streptococcal pyrogenic toxins, and the toxic shock syndrome toxin. Superantigens create stable bonds across class II molecules of major histocompatibility complex (MHC) and specific variable (VB) T-cell receptors on TH cells, causing a release of disease-producing cytokines. SEB may be aerosolized or used to sabotage food supplies. As a weapon it would induce substantial, prolonged morbidity (up to 2 weeks) with little mortality.

Reporting Requirements for Disease:

Any suspect cases of SEB intoxication should be reported within one working day to your local health authority at 1-800-705-8868; or, call the Texas Department of State Health Services at 1-800-252-8239. Case clusters or multiple cases should be reported immediately.

Infection Control/Decontamination:

Healthcare workers should exercise Standard Precautions. Decontaminate surfaces with soap and water and a hospital grade disinfectant.

Incubation Period: 1-6 hours

Signs/Symptoms: From 1-6 hours after aerosol exposure to SEB, a distinct syndrome of high fever, chills, myalgias, nonproductive cough, dyspnea, and severe substernal chest pain may appear. Headache is also common, and nausea, vomiting, and anorexia may occur.

Illness usually lasts for a few days, but is rarely fatal. Physical examination may be unremarkable or reveal inspiratory and/or expiratory rales. Following SEB ingestion, symptoms are primarily vomiting and diarrhea; fever only occurs in about one quarter of ill persons and respiratory involvement is absent.

Though symptoms may be quite severe and lead to dehydration or even shock, illness usually lasts less than 12 hours.

Physical examination may be unremarkable or reveal inspiratory and/or expiratory rales. Were Toxic shock syndrome toxin-1 (TSST-1) or streptococcal pyrogenic exotoxins to be used they would likely cause acute erythroderma followed by desquamation and multiorgan failure.

Diagnosis

Differential Diagnosis: As with aerosol exposure to SEB, an epidemic of influenza, adenovirus, parainfluenza, or mycoplasma could cause fever, nonproductive cough, myalgias, and headache occurring in large numbers of people in a short time. Early clinical manifestations of SEB may also be similar to those of inhalation anthrax, tularemia, plague, or Q fever, but the rapid progression of respiratory signs and symptoms to a stable state distinguishes SEB intoxication. Oral ingestion of SEB would be difficult to distinguish from other toxins causing nausea and vomiting, such as that produced by the heat-stable toxin of *Bacillus cereus* as well as intoxication with metals or nitrates. Illness associated with TSST-1 or streptococcal pyrogenic exotoxins must be distinguished from other causes of acute erythroderma such

as Stevens Johnson syndrome, Kawasaki syndrome, scarlet fever, toxic shock syndrome, measles, erysipelas, meningitis, RMSF, and leptospirosis.

Diagnostic Tests: Laboratory confirmation of SEB intoxication includes antigen detection (ELISA) on environmental and clinical samples, and PCR to detect Staphylococcal genes in environmental samples. Early postexposure (<24 hours) nasal swabs, induced respiratory secretions, and/or blood (collected in tiger-top or red top tubes) may be collected for toxin assays. Although toxin is transient in serum, it accumulates in the urine and is detectable for several hours postexposure. Antibodies generally develop within 6 days of exposure; acute and convalescent sera and urine may be collected for immunoassays.

Specimen Submission: All specimens must be triple contained in an approved shipping container and have biohazard labels. Although there is no specific hazard to personnel handling specimens, the receiving laboratory must be alerted prior to transport by calling (800) 252-8239 ("press 1"). Newly available diagnostic tests may be discussed at that time. Specimens must be accompanied by a Specimen Submission Form (G-1A) and submitted to the Texas Department of State Health Services Laboratory, 1100 West 49th Street, Austin, TX 78756.

Additional Tests: Chest x-ray, although usually normal, may show increased interstitial markings (Kerley B lines), atelectasis, and possibly overt pulmonary edema or an ARDS picture may develop. A nonspecific neutrophilic

leukocytosis and an elevated erythrocyte sedimentation rate may be seen.

Treatment: Supportive care with close attention to oxygenation and hydration, and in severe cases, ventilation with positive end expiratory pressure and diuretics. Acetaminophen and cough suppressants may make the patient more comfortable.